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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,172	06/19/2001	Eugene A. Fitzgerald	ASC-044	2822

7590

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EXAMINER

LATTIN, CHRISTOPHER W

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 09/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/884,172

Applicant(s)

FITZGERALD ET AL.

Examiner

Christopher W Lattin

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 26 and 27 is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 2812

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-15 and 17-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rim et al. (Enhanced Hole Mobilities in Surface-channel Strained-Si p-MOSFETs, Solid state Electronics Laboratory, Stanford, CA 94305, pp. 20.3.1-4, cited by applicant).

Rim et al. teaches a method of providing a p-MOSFET having a Si substrate, a $\text{Si}_{1-x}\text{Ge}_x$ graded layer, a relaxed $\text{Si}_{1-x}\text{Ge}_x$, and a strained $\text{Si}_{1-x}\text{Ge}_x$ layer for a channel, and discusses in the Introduction section that the formation of n-MOSFET's is well known. One skilled in the art at the time of the invention would have found it obvious, as suggested in the Summary section of the Rim et al. reference, to form both n- and p-MOSFET's on the same layers to perform CMOS functions. Although the Rim et al. reference fails to specify what types of devices could be formed using NMOS and PMOS transistors, Official Notice is taken regarding the well-known fact that NMOS and PMOS transistors can be combined to perform many functions including those enumerated in claims 20-25.

Art Unit: 2812

Claims 1, 4, 13, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rim et al., as applied to claims 1 and 13 above, in view of Chu et al. (U.S. Patent 5,906,951, cited by applicant).

Rim et al. are applied supra and teach all of the limitations of the claimed method, with the exception of the use of an oxide layer between the graded layer and the Si substrate. Chu et al. teach the use of an oxide layer for isolation. It would have been obvious to one skilled in the art at the time of the invention to use an oxide between the graded layer and the Si substrate taught by Rim et al. in order to isolate the transistors.

Allowable Subject Matter

Claims 26 and 27 are allowed. The prior art of record fails to adequately anticipate or obviate either singularly or in combination with another reference a method for providing a CMOS inverter by providing a Si substrate with a $\text{Si}_{1-x}\text{Ge}_x$ graded layer and a relaxed $\text{Si}_{1-x}\text{Ge}_x$ layer thereupon, bonding the relaxed layer to a structure that includes a second Si substrate, removing the first Si substrate and the graded layer, providing a strained $\text{Si}_{1-x}\text{Ge}_x$ layer on the relaxed layer to form a heterostructure, and forming PMOS and NMOS devices in such a way that the channel regions fall within the strained layers.

Art Unit: 2812


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Lattin whose telephone number is (703) 305-3017. The examiner can normally be reached Monday through Friday from 8:00 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling, can be reached at (703) 308-3325. The fax numbers for this Group are (703) 872-9318 for responses to non-final actions and (703) 872-9319 responses to final actions.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

CWL
September 20, 2002


John F. Niebling
Supervisory Patent Examiner
Technology Center 2800